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ABSTRACT

The document presents the theoretical background and empirical research supporting lessons which teach study skills to adolescents, especially those with learning disabilities. A section presenting the psychological rationale for training study skills considers the nature of studying and its psychological demands, studying as an active process, metacognition, studying as a learning activity, research conclusions, and the study performance of learning disabled students. The next section looks at empirical work leading to development of the instructional materials. The third section focuses on four general study strategies and four specific strategies. General study strategies include organizing for study, checking concentration, finishing a study session, and review sessions. Specific strategies are concerned with memorization, questions and problems, writing assignments, and studying notes or books. The materials consist of a set of lesson scripts and a set of mnemonic cards for student use. Lesson scripts were designed in accordance with principles of direct instruction with each lesson covering the aim of the lesson, an overview, a rationale, instruction on the lesson content, examples, a summary, and supervised practice. (DB)

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RESEARCH INSTITUTE FOR THE STUDY OF LEARNING DISABILITIES

Teachers College, Columbia University

TEACHING GENERAL AND SPECIFIC STUDY STRATEGIES TO LEARNING DISABLED ADOLESCENTS: LESSONS READY FOR VALIDATION

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Technical Report #31

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1. INTRODUCTION

The purpose of this paper is to introduce a set of lessons and accompanying materials which have been designed to teach study skills to adolescents with deficiencies in this area, most particularly those students classified as learning disabled. The lessons consist of a series of seven units designed to teach certain general and specific study strategies to a proficiency criterion. As the field-testing of a set of materials such as this is an imposing task, which is likely to take a long period of time, the materials are being made available before they have been field tested. It is hoped that researchers interested in improving the study skills of inefficient students will be able to build upon this work by field testing the materials presented here or by modifying the current materials for use in related research projects.

Presentation of materials in this fashion presents the great risk that the materials may be adopted uncritically for routine classroom use for children with learning difficulties. There is no basis for such use at this time, since these materials have not been field tested. To guard against this possibility and to enable the materials to be used thoughtfully in research, the materials are presented in the context of the theoretical background and the empirical research from which they were developed. Furthermore, at the end of the paper, following presentation of the actual materials themselves, we present a prospectus for the kind of programmatic research which could be done using these materials. Our conclusion from this discussion will be that thoughtful research on study skills can advance both basic cognitive research and applied cognitive training.

We acknowledge the conceptual problems involved in treating studying as a unitary cognitive skill, and the formidable measurement problems this

type of research presents. We argue, however, that programmatic study skills research which employs a micro-longitudinal research methodology, and uses reliable qualitative measures of studying has the potential to advance our understanding of the nature of studying and of study skills instruction.

2. PSYCHOLOGICAL RATIONALE FOR THE CURRENT APPROACH TO TRAINING STUDY SKILLS

Before any type of cognitive training is undertaken, it is important to understand the nature of the process of interest; the demands this type of process makes on students; the training techniques that are most likely to facilitate improved performance; and the nature of the performance deficits that are characteristic of those students who have difficulty in mastering the process of interest. We will now address these issues for the domain of study skills.

Our discussion will begin by considering developments in cognitive and instructional psychology during the past decade which have led to a reconceptualization of learning as an active student-centered process. We will then elaborate on this model, describing the active role of the student in the learning situation, and discussing four important contextual variables. Interactions among these variables must be considered to gain a complete understanding of the process of learning. We will then apply this model to the process of studying, and from there will go on to demonstrate precisely how this model relates to the instructional materials we have developed. Next, we will briefly review the significant issues from the training literature which have influenced our instructional approach. Finally, we will examine aspects of the performance of learning disabled students which suggest the need for study skills instruction.

2.1 The nature of studying and the psychological demands it makes on the student.

Ideas about the nature of studying have undergone considerable change in less than a decade. In a critical historical survey of the literature, Anderson (1980) points out that there is a conspicuous lack of empirical

support for most study strategies (e.g., note-taking, underlining, outlining) and adjunct study aids (e.g., advance organizers, text embellishments, instructional objectives). Anderson explains that part of this failure has been due to lack of experimental control and to the generally poor quality of much of the research in this field. When one looks back at study skills research from the more sophisticated psychological perspective that is now available, further insight regarding the lack of results emerges.

Anderson and Armbruster (1980) and Brown, Bransford, Ferarra and Campione (1983) point out that a significant reason for the failure of earlier research approaches is the consistent emphasis on product-oriented rather than process-oriented research. Product-oriented research is concerned with demonstrating the training effects of a given instructional package by producing statistically significant effects in its favor. Study skills research has, for the most part, failed in this endeavor. Process-oriented research, on the other hand, is concerned with observing the psychological phenomenon of interest, while it is occurring, and with attempting to understand the principles governing its operation. The argument advanced by Brown et al. (1983), and by Anderson and Armbruster (1980) is that past research in study skills has failed precisely because it has ignored the psychological characteristics of the student, and the interaction between the student and what might loosely be called the context of studying. They argue that it is only through a consideration of these factors that any plausible psychological explanation of the process of studying is likely to emerge.

Our purpose in this section of the paper is to examine the progress that has been made during the past decade toward developing just such a model. Before this discussion, however, two points must be emphasized. First, while

there has been considerable progress in developing a plausible psychological model of the studying process, this success has been primarily at a theoretical level. There is very little empirical data to support the model. Much of what we are about to discuss is well-informed speculation combined with research results from those cognitive domains (e.g., memory research) in which comprehensive research data are available. Second, our account is not intended to be exhaustive. Rather, its purpose is to make explicit the psychological content within which the current materials were developed. As such, the account is selective and interpretive. Readers who are interested in the issues raised are urged to consult the original sources for a thorough discussion.[1]

Studying as an active process. Anderson's (1979; 1980) work on the studying of text provides a useful entry-point to a discussion of the active role of the student in learning. Anderson begins by stating that "the process of studying text is viewed as a criteria related, self-directed form of reading text" (1979, p. 77). This view immediately shifts the emphasis onto the student since she or he must be aware of the purpose for which the reading is being done, and since she or he must actively direct how the material is studied. Elaborating on just how these two activities occur, Anderson (1979, 1980) proposes what he calls a "self-instructional" model of studying. This model is built by an analogy to principles of instruction, in that studying is viewed as a form of instruction in which the learner actively teaches her- or himself the material under study. In operational terms, Anderson's self-instructional model of studying text requires the student to engage in the following three activities:

(1) clarify the purpose for which the material is to be studied

(2) engage in a recursive cycle of monitoring on-going comprehension of the material and indulge in corrective feedback to correct

misunderstandings, until the material is understood

(3) augment the knowledge base by consciously creating elaborative connections between the new material and existing knowledge.

Anderson's self-instructional model places the student firmly at the center of the studying process. This is so because the student is now regarded as having an active decision-making role in thinking about the prevailing study criteria; in selecting study strategies that match these criteria; and in monitoring on-going progress to ensure that the match between the study strategies being used and the criteria of the study assignment continues to be optimal. At this point it is clear that studying is not only a student-centered activity but, if this model is correct, that it is also a complex cognitive skill involving sophisticated judgments on the student's part. Anderson's approach is distinct in that he explicitly links his model to a psychological theory: "In my judgement, it is the combination of metacognitive and cognitive behaviors that makes studying (self-directed instruction) a unique and very complex type of instruction" (Anderson, 1980, pp. 496-497). As the notion of metacognition has proven so central to the theory of self-directed activity which underlies most, if not all, contemporary research in study skills, we will now turn to a critical discussion of this notion and the theory of learning to learn which has been derived from it.

Metacognition. With the introduction of the notion that the student is active when learning and has the ability to make sophisticated judgments, select strategies, and monitor progress toward a desired goal, the notion of metacognition was born. Once psychologists realized that a mere description of cognitive strategies was inadequate to describe human thinking, a higher (or meta-) level of thought was conceptualized to explain how people operate on

their own cognition. In the early days, the definition of metacognition was as global as this:

> Metacognition refers to one's knowledge concerning one's own cognitive processes and products, or anything related to them, e.g., the learning-relevant properties of information or data.... Metacognition refers among other things to the active monitoring and consequent-regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective" (Flavell, 1976, p. 232).

Unfortunately, in the intervening years, despite extensive discussion of the idea of metacognition by Brown (1978; 1980; Brown & DeLoache, 1978) and many others, Brown et al. (1983) admit that the term is still used in such a plethora of contexts, and with so many shades of meaning that it has lost power as a concept.

In an attempt to impose some order on the concept, Brown et al. (1983) first point out that metacognition is at a higher psychological level than cognitive strategies, and that it is incorrect to describe mere cognitive strategies as metacognitive. They also attempt to clarify the concept, harking back to Flavell's definition, by stating that metacognition can be used to describe both <u>knowledge about cognition</u> and <u>regulation of cognition</u> (1983, p. 86). Knowledge about cognition is described as the relatively "late-developing information human thinkers have about their own thought processes and those of others" (1983, p. 87). It requires the ability to reflect abstractly on one's own knowledge and thought processes. The second form of activity that may come under the rubric of metacognitive skills is self-regulatory skills which include "planning activities prior to undertaking a problem . . . monitoring activities during learning . . . and checking outcomes to evaluate one's

progress toward a given goal" (1983, p. 87).

Our own view of the issue is that the umbrella term "metacognition" is misleading, and that it has very limited explanatory power when applied to phenomena as diverse as knowledge about cognition and the regulation of cognition. Metacognition should probably be reserved for the former (i.e., knowledge about cognition), an area that seems truly at the meta- level of processing; we prefer to call the latter (i.e., the regulation of cognition) self-regulation. This distinction has the practical advantage of separating the aspects of cognition that are relatively visible and that lend themselves to study from those which are subject to conceptual confusion and which are notoriously difficult to investigate.[2]

Much of the literature on "metacognition" which has formed the basis for our work would appear, in practice, to adopt the simple meaning equating metacognition with self-regulatory skills. In a discussion of the cognitive demands of reading, for example, Brown (1980) says:

> The skills of metacognition are those attributed to the executive in many theories of human memory and machine intelligence, predicting, checking, monitoring, reality testing and coordination and control of deliberate attempts to study, learn or solve problems (Brown, 1978). These are the basic characteristics of thinking efficiently in a wide range of learning situations, including effective reading (1980, p. 454).

Brown's statement is of interest for reasons other than the operationalization of metacognition that it contains. For our purposes, its more important implication is that it suggests that self-regulatory skills play an important part in efficient thinking, and consequently in the development of effective study skills. Indeed, in the next statement, Brown makes the relationship explicit:

> In addition, these are the type of monitoring activities that have been observed by educationalists interested in study skills... The merging of ideas derived from psychological models of human thinking and observations of activities undertaken by efficient learners is, therefore, particularly, exciting (1980, p. 454).

It is thus that the theory of self-regulation and the idea of the active learner provide a psychological perspective for the study of study skills. We will now examine how the general idea of self-regulation has been translated by Brown and her colleagues into a model of studying as an active learning process. This is the model which has guided our work.

Studying as a learning activity. Brown (1982) points out that cognitive and developmental psychologists have generally avoided the term "learning" because of its historical connection to behavioristic learning theory. Brown suggests, however, that although the term "learning" is usually avoided, much of the current research on knowledge acquisition can be described by a more enlightened form of the notion of learning. Psychologists are, in fact, showing an increasing willingness to use the term "learning," to describe the complex cognitive activities that are necessary for the efficient acquisition and deployment of knowledge.[3] Brown (1982a) outlines the prototype for a modern form of learning theory; a theory that she and her colleagues (Armbruster & Anderson, 1981; Brown, Campione, & Day, 1981; Brown et al., 1983) argue provides a useful framework for conceptualizing studying as a learning activity.

Brown (1982a) states that learning (i.e., acquiring knowledge) involves the development and refinement of four interrelated forms of knowledge. She says that novices differ from experts in terms of their repertoire of strategic skills and their level of factual information. Both factual and strategic knowledge can be further subdivided into general and specific forms of knowl-

edge. Thus, in the area of factual knowledge, some of the knowledge that is acquired may be domain-specific sets of facts, while other factual knowledge may be utilized by the learner in such a way that it becomes the general kind of factual information that helps create organizational schemes which are then used to integrate future learning with existing knowledge. With regard to strategic knowledge Brown (1982a) suggests that this too can be of a general or specific type. Strategies may be of the general type which Brown refers to as metacognitive, and for which we have reserved the term self-regulatory. These strategies are regarded as general because they can be applied to the management and monitoring of the learning process across a wide variety of learning contexts. At the same time there are many learning situations (e.g., serial order learning) which require the use of specific procedural strategies (e.g., cumulative rehearsal), and therefore such specific strategies represent the fourth type of knowledge in Brown's schematic model of learning.

Turning now to the question of acquisition or learning, and considering that knowledge has been defined to cover a wide range of factual and procedural knowledge, it is not surprising that Brown's model of learning is quite a complex one. Borrowing from Jenkins (1979) and Bransford (1979), Brown (1982a; Brown et al., 1983) suggests that learning can best be understood by considering it in the total context in which it occurs. According to the proposed model, the learning context is regarded as having at least four important components. To understand learning, it is necessary to understand these components and how they interact. The four factors are: (1) the learner's activity; (2) the characteristics of the learner; (3) the nature of the materials under study; and (4) the goal of the study assignment, or "criterial task."

With respect to the first of these, learner's activities refers to the

need for the student to apply cognitive strategies to a given learning situation. Possession of the requisite skills for, say, studying text, is of little value unless the necessary strategies are selected and deployed appropriately and efficiently. A particular feature of cognitive strategies, as Brown (1982a; Brown et al., 1983) points out is that they may be remarkably resistant to change. Thus, when introducing new learning techniques, it is important to be sensitive to the particular difficulties students may have in abandoning old strategies in favor of new ones. A second feature of cognitive strategies is that their deployment is very much a function of the other features of the learning context.

The characteristics of the learner must also be considered part of the learning context. Apart from such important features as emotional, motivational and attitudinal state (which cognitive theorists have, until very recently, ignored), an important cognitive characteristic of the learner is his or her existing knowledge base. The rate of acquisition and the meaningfulness of what is learned clearly are dependent on the individual's existing level of knowledge and the ability to relate new information to previously acquired knowledge. A third aspect of the learning context is the nature of the materials which are to be studied. The organization of the material to be learned, the student's understanding of this structure, and his or her ability to take advantage of it, will clearly influence the quality and rate of learning. Finally, we must consider the criterial task. Brown sums up the importance of this aspect of the learning context: "Learning is not undertaken in a vacuum; there is always an end product in mind, and the effective learner is cognizant of this end product and tailors his learning activities accordingly" (1982a, p. 94).

Brown (1982a) summarizes this complex model of learning by pointing out

that "learners' activities are purposive and goal-directed" (1982a, p. 94). It is only by understanding the learner and the range of decisions he or she has to make, based upon knowledge of self, understanding of the criterial task, and relative ability to take advantage of the structure of the material, that we can hope to understand the process of learning in context. In this sense, as Brown points out, the roles of psychologist and learner are nearly synonymous, in that the successful one in either case is the one who truly understands the features of the learner-in-context model and its interactions.

Having briefly presented this modern form of learning theory, we will now discuss how it applies to study skills. Our discussion will center on the work of Brown and colleagues (Armbruster & Anderson, 1981; Brown, Campione, & Day, 1981; Brown et al., 1983). Brown et al. (1983) summarize the task of the learner as follows: "She must tailor her activities finely to the competing demands of all these forces [i.e., the four factors] in order to be an effective learner. In other words, she must learn how to learn" (1983, p. 85). It is this issue of learning to learn that guides modern research in study skills, and which our own research has attempted to address.

According to Brown and colleagues, studying is a prototypic example of a complex form of learning. Effective study, they say, requires first of all that the student be aware of the criterial task. Armbruster and Anderson point out, "The more specific the student's knowledge about the task, the greater the effectiveness of studying" (1981, p. 154). Thus, in the case of studying for an exam, the student who has a clear sense of the type of exam to be given; the number of questions to be answered; the amount of choice permitted in selecting questions to respond to; and so on, has a clear advantage over the student who is ignorant of this information or who fails to even consider

the nature of the criterial task.

Second, successful studying is enhanced by having a clear understanding of text structure so as to take maximal advantage of the cues that are present in a given piece of text. Research is currrently underway on the features of text which are important (e.g, Mandler, 1979; Mandler & Johnson, 1977), and on how to promote children's ability to monitor their comprehension so as to gain maximal benefit from these textual cues (e.g., Markman, 1977; 1979; 1981). Third, student characteristics have an important role to play in studying. As we mentioned above, apart from emotional and attitudinal factors, what is important is the student's ability to integrate the information under study with existing knowledge so that it becomes meaningful. It is not certain quite what is involved in this process, but clearly it requires a sophisticated awareness of the level and organization of existing knowledge so that connections can readily be formed to help integrate the new material. This would appear to be the truly metacognitive skill of knowing about one's own cognition, that we suggested earlier was so difficult to study. Finally, the student needs strategic knowledge. Brown's learning model suggests that two types of strategic knowledge are necessary. First, the student needs general self-regulatory strategies such as predicting, checking, monitoring, engaging in recursive remediation and self-evaluation in order to be able to manage the course of any study session. Second, the student also needs to have the kind of specific procedural strategies that are necessary for such specialized activities as, for example, memorization, essay writing and reading from te t.

Research conclusions. Considering the complexity of this interactive learning-in-context model of studying, how then might one train students to study? Clearly, the comprehensive solution would be to engage in training of

the four components of the model, and their interactions. In our research, we have opted for a simpler approach. We have decided to focus our training only on two of the four components of the model.

We chose to focus on those components of the model which cognitive instructional psychologists understand best; teaching students to identify the criterial task and instructing them to use appropriate self-regulatory and specific procedural strategies in order to perform the task. The actual strategies that we selected for inclusion in the training will be described in section 4 of this paper. Consideration of which strategies should be taught was based on a combination of insights gained from the theoretical material discussed in this section and the empirical and formative research which will be described in the next section.

Our justification for omitting the learner characteristics component is that it is too poorly understood to be usefully operationalized. Recall that in the previous discussion, we concluded that at the moment this part of the learning model appears to be synonymous with true metacognition, with all its attendant problems. We decided to drop knowledge about text structure for a different reason. The study of the organizational features of text and their influence on text processing is a subdiscipline of psychology in its own right. We concluded that this is a highly technical area of study which requires expertise of a different nature than ours. Hopefully, at a later point, this work will integrate directly with instructional concerns such as ours.

We should point out that although our working model is considerably narrower in scope than the learning model proposed by Brown and her colleagues, we think that research and training at this narrower level is justified on two counts. From the purely pragmatic point of view, research on text structure

and on student characteristics is at such a formative stage that there is as yet no prospect for instructional recommendations. Second, from a more positive perspective, we believe that some components of the instructional program we have created hold promise of teaching truly general study skills. We believe that our general strategy lessons represent a useful operationalization of the skills needed to identify an appropriate study goal; to identify the self-regulatory skills needed for study; to monitor progress toward the goal; to make revisions as necessary; and to perform a final evaluation to determine if the goal has been attained. If students succeed in acquiring these skills, we think that they are likely to show improvement in their general approach to study even if they are deficient in knowledge of text structure and level of metacognitive awareness. In fact, we believe that metacognitive awareness, particularly as defined by Brown and her colleagues, is closely allied to the concept of verbal intelligence. We wonder whether metacognitive awareness, or verbal intelligence, can actually be trained.

We are less confident, however, that we have a perfect defense for the specific procedural strategies selected for training. As Newell (1979) points out, decisions on the level of generality versus specificity in cognitive training involve an understanding of the trade-off relationship between power and generality. The strategies that we selected represent our best guess about the level of generality one can include without losing procedural effectiveness. Whether we are correct or not is an empirical question, but we readily admit that our specific strategies may risk oversimplifying the steps necessary to complete certain types of study assignments.[4]

Finally, we should mention the rationale for the training approach which is assumed in our instructional materials. (The reader is also referred to

Brown et al. (1983), and Brown and Campione (1978) for a thorough discussion of the issues involved in designing and interpreting training studies.) Our lessons are as close as possible to the conditions of ecological validity for training studies laid down by Brown and Campione (1980):

> We suggest that the types of cognitive activities which are most suitable for intensive intervention should have certain properties: (a) they should be applicable to a wide range of situations, (b) they should be readily seen by the children to be reasonable activities that work, (c) they should have some counterpart in real-life experience, and (d) their component processes should be well understood so that effective training techniques can be devised (1978/1979, p. 19).*

In terms of the actual training process, the approach we advocate represents a combination of the informed training and the self-control training approaches discussed in Brown et al. (1983). This combined approach involves giving the students a clear psychological rationale for the strategies under instruction (i.e., informed training), as well as explicit training in the general self-regulatory strategies (i.e., self-control training) which we discussed earlier. By combining these two types of instruction with training to a proficiency criterion, also recommended by Brown et al. (1983), we believe the training has an increased likelihood of being meaningful (i.e., informed); of not impinging too heavily on the student's processing capacity (due to training to criterion); and of improving students' general study management skills through self-regulatory training.

The psychological rationale for the study skills lessons central to this report has been described. The next question is: Are there particular reasons

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to provide study skills instruction for learning disabled students? An attempt to answer this question follows.

2.2 The study performance of learning disabled students

A summary of the rationale for study skills instruction developed in the previous section of this report provides a perspective for considering the study performance of learning disabled students.

We define "study" as self-directed, intentional learning. We assume, therefore, that efforts to teach children to study must be based on a model or theory of learning. The study skills lessons presented here are based on the theory that children, as they grow up, learn how to learn. If this is true, children's study methods should change as they grow older and the changes should reflect increasingly sophisticated knowledge about learning. Results from cross-age investigations of children's study methods do provide some support for a learning to learn theory (Brown et al., 1983). These investigations provide descriptions of the knowledge about learning which children acquire.

Children acquire both general and specific knowledge about learning. In particular, they learn that learning is goal-directed, self-conscious and self-regulated. They learn to define the goal or outcomes of learning, to work at learning and to think about and regulate the work of learning. They learn to establish links and relationships between the "to be learned" and "the already known." They acquire a repertoire of routines and tactics which aid learning. This knowledge about learning is, in fact, reflected in the way children study.

While there are detailed descriptions of normally developing children's study methods, there is very little direct evidence describing the study methods used by learning disabled children. Data from observations and teacher ratings indicate that learning disabled children spend less time working on lessons in

the classroom than non-disabled children (McKinney & Feagans, 1983). These data confirm long-standing impressions that learning disabled children are inattentive and are not persistent. These data also suggest that learning disabled children do not study.

There is evidence that children who are poor readers are less inclined to detect and correct errors when they read aloud than good readers. Poor readers are also more tolerant of errors and inconsistencies in text than good readers (for a review of these studies, see Brown, 1982b). These studies suggest that learning disabled children are not monitoring their actions, at least when they read. We do know that learning disabled children are less inclined than non-disabled children to use specific strategies (i.e., rehearsal, organization, elaboration, etc.) for memorizing information (for a review of the memory strategy research with learning disabled children, see Worden, 1983).

We can infer, from the evidence just cited and from teachers and parents' impressions, that many learning disabled children are not inclined to use those study skills which are characteristic of the study performance of non-disabled children. There is, however, reason for cautious optimism regarding the benefits of study skills instruction for learning disabled children. There is some evidence that learning disabled children benefit from instruction to use both general and specific study skills.

Most of the evidence comes from research on memory strategy instruction. Learning disabled children benefit from instruction to rehearse on serial recall tasks (Tarver, Hallahan, Kauffman & Ball, 1976; Torgesen & Goldman, 1977); to group items by category on free recall tasks (Dallago & Moely, 1980; Torgesen, 1977) and to use an elaboration strategy with a paired-associate learning task (Solar, 1983). With respect to the use of category organization as a memory

strategy, there is evidence that learning disabled children maintain the use of the strategy over time (Cort, Shepherd & Frank, 1983) and that they will use the strategy with a new task (Gelzheiser, 1983). We also know that learning disabled children's ability to comprehend text is enhanced by teaching them to ask themselves questions as they read (Wong & Jones, 1979) and by teaching them how to define the criterial task (Wong, Wong & LeMare, 1982).

The lessons in this report differ from any previous attempts to teach study skills to learning disabled children in two important ways. First, these lessons attempt to teach both general and specific study skills. (The distinction between general and specific study skills is made in the previous section of this report.) The instruction is, therefore, comprehensive. Second, these lessons use children's homework assignments as the basis for study skills instruction. Most study skills lessons use workbooks and practice exercises unrelated to children's school work.

3. EMPIRICAL WORK LEADING TO THE DEVELOPMENT OF THE CURRENT MATERIALS

Although the study skills materials presented here have not been tested, their development is a consequence of previous research and pilot investigations. The enterprise began when the first author and some colleagues set out to develop a study skills training package for junior high school students. A computer search at that time led us to agree with Anderson (1980) that there was very little sound empirical work on study skills and study skills instruction. We were particularly interested in Anderson's suggestion that an important reason for the failure of research on study skills was that for the most part it was pursued as an educational endeavor, independent of psychological theory. Consequently, we set about developing a set of training materials that had an explicit psychological rationale and that could be tested under rigorous experimental conditions. The psychological rationale that we chose was an earlier, less sophisticated version of the learning to learn approach which currently guides our work.

What emerged was a study (summarized in O'Loughlin, Brobst, Chernick, & Oehlsen, 1982) in which a group of eighth-grade students received instruction in a variety of study skills over a nine-week period. The principal value of this study was that it led to considerable revision in our thinking about the nature of study skills and the methodological issues that need to be dealt with in this type of research.[5]

3.1 Summary of the initial empirical study

A program of study skills instruction was tried out with an eighth-grade parochial school population. The sample consisted of two eighth-grade classes (N = 50) of which one class (N = 24) comprised the experimental group, while the other class (N = 26) became the control group. When the students were compared

on end-of-year SRA reading scores, we discovered that the control group exactly matched the lower half of the experimental group, and thus served as a matched control group for this lower portion of the experimental group (N = 12). Training for the experimental group consisted of one period of instruction a day for a nine-week period. The control group received no special training.

Instruction. The instructional materials consisted of a series of lesson scripts designed to teach students to study independently and to complete homework assignments, without assistance, at home. The content of the materials was based on findings in the literature regarding the essential elements of any study skills program. The following seven topics were covered:

- How to organize the home study environment
- How to allocate study time across assignments
- How to identify and state the goal of a homework assignment
- How to memorize lists using a cumulative rehearsal technique
- How to study for assignments that require something other than studying a textbook
- How to do an assignment requiring the answering of questions in the text
- How to identify main ideas and details in prose passages.

The instruction proceeded by means of a series of lessons at a variety of reading levels. Each lesson was followed by paper-and-pencil exercises until it was judged that a proficiency criterion had been reached on a given topic. Instruction in the next topic then took place. There were two notable features of the instruction. First, the lessons were constructed on the basis of direct instructional principles (Lloyd, Epstein & Cullinan, 1981; Rosenshine, 1978). Second, each lesson included an explicit psychological rationale.

Third, to maintain student motivation, reinforcers were introduced. This entailed having the students work toward earning a diploma and toward seeing a movie of their choice at the end of the training period.

Measures. Two different types of measures were used as pre- and post-tests.

- Content test (study skills): The students' understanding of the information that had been presented to them was measured by means of a 21-item multiple-choice test which spanned the concepts covered in the instruction.
- Reading comprehension: Children's study performance was measured by their performance on forms of the Iowa Test of Basic Skills, Reading Comprehension Subtest (ITBS), Level 14, and by means of an experimental comprehension test which followed the format of the practice exercises on which the students had worked.

Results. Data analysis revealed statistically significant effects for both the students' acquisition of knowledge about studying [Content test: t (36) = 7.76, $p < .001$], and their performance on the ITBS, irrespective of prior reading level [ITBS: t (35) = 4.97, $p < .001$]. No significant effects were found for the experimental test.

While we were pleased to have succeeded in demonstrating significant effects for our training, we had reservations about the procedures we had attempted to train. We felt they were artificial and too complex. We were also unhappy about the lack of information provided by the limited, purely quantitative measures on which the study depended (O'Loughlin et al., 1982). Further reflection on the shortcomings of this study led the current authors to develop the materials under discussion in this paper. As the structure

of the current materials has been designed largely in response to those shortcomings, it will be instructive for us to examine precisely how that study affected our thinking about how to study studying.

3.2 Theoretical conclusions from the initial empirical study

A striking fact about the material used in the previous study was its complexity. The procedures were so complex and so lengthy we had trouble remembering them ourselves! They placed an extreme burden on the students' memories and they were unnatural and counter-intuitive. Under any conditions teaching new strategies is likely to be challenging because people resist abandoning familiar strategies, however inefficient they may be, in favor of new or novel strategies (Brown et al., 1983; Kuhn & Phelps, 1983). In our case, the chance for success was much diminished because of the complexity of the replacement strategies. As a result, we concluded that in the future all the strategies that we offered should be simple enough to enable them to be easily mastered, and they should be intuitively plausible. It should be easy for the students to understand and accept their function. Another problem was that the instruction covered a range of study strategies without providing any integrating links to enable the students to fit the components into some kind of overall scheme. The lack of an integrative framework probably hindered the students' assimilation of the material we taught. Influenced particularly by the discussion in Brown et al. (1983), we developed a conceptual framework for the current materials which is based upon a distinction between general and specific strategies. This distinction is useful because it helps students understand how the various parts of the instructional package combine to contribute to their overall study ability. The distinction between general and specific study strategies also has potential as a research device in helping

to understand which parts of the instruction are effective for different types of students in various contexts.

3.3 Methodological conclusions from the initial empirical study

As a result of our experience in the classroom we felt obliged to make a number of changes in the content and presentation of the materials and in research design. One of our primary concerns was to do research that was likely to be pertinent to the regular classroom setting. Since the first study fell far short of this goal, a number of changes were made in the present materials. The first of these was the decision to drop the extrinsic reinforcement system (i.e., the movie and diploma) because such contingencies are neither appropriate nor common in the classroom. They are counterproductive also in that they provide one more confounding explanation for any positive effects that the training may have. We decided to make two other important changes. In the study just described, we had used special worksheets for student practice, and all lessons were taught by the experimenters. The current lessons are more contextually valid since the study materials are used by the students with their regular classroom assignments. Thus, the lessons can be taught by the teacher.

The other major issue that emerged from the first study was the need to reconsider the relationship between the instructional materials presented and the outcome measures used. While we succeeded in getting significant results on a standardized reading test, we had no evidence that the students were scoring better because they were using our study methods. In other words, the quantitative results we obtained were not helpful in explaining the effects of the training. This led to the conclusion that meaningful research on students' study skills must incorporate some observational measures of what the students are actually doing as they study, so that we can see the effects of

the training. We decided to orient our training toward those study skills that we would be able to observe directly. This decision led us to drop much of the material on time allocation and control of the environment, and to shift the emphasis from study in the home to study in a study hall. Consequently, the current instructional materials are geared towards training students to complete their homework assignments more efficiently in a supervised study hall. The advantage of this change from the teacher's point of view is that it provides the opportunity for hands-on training and direct supervision to ensure that each student attains the desired proficiency criterion. For the researcher, using a supervised study hall permits the use of observational measures of study performance, thus increasing the validity of the study. Furthermore, experimental control is enhanced.

3.4 Subsequent research leading to the development of the current materials

Once we decided that the first study was inadequate, and before we had clearly identified why it was problematic, we decided to survey a large number of students to evaluate the degree to which our assumptions about students' behavior in study hall, and students' attitudes towards studying, were correct. To do this, we gave a questionnaire to the entire ninth-grade (N = 75) of a public junior high school. The survey[6] elicited information about students' schedules, study priorities, record keeping techniques, response to deadlines, etc. It also requested information about the students' attitudes and goals and the perceived relationships between their own attitudes and those imposed by their parents and teachers. We did not submit the responses to formal statistical analysis. However, our informal analysis provided a wealth of practical information that enabled us to make firm decisions as to what aspects of training in study skills should or should not be included in the training program.

Our next step was to hold a series of discussions with the school psychologist and the special education teachers in the same public school. These staff members were actively involved in providing educational and psychological support services for both the learning disabled students and those with a history of study difficulties. Their opinions proved useful both for helping us to identify the areas in which students typically have study difficulties, and in offering practical suggestions for the instructional program.

As the materials began to take shape we tested them with a group of eight seventh-grade parochial school students. The students received instruction over a period of two weeks from a trained teacher. The emphasis during this pilot study was on formative data. The instructor kept an instructional diary and, as a result, many subsequent refinements were made in the lesson scripts.

When the instructional materials were close to their final form, we interviewed a number of eighth-grade students about their knowledge of studying and their opinions about how to study. The purpose of these interviews was to gain information that would form the basis for a series of semi-structured interviews which we hoped to use as a qualitative measure of changes in study skill competence over time. The formative studies just discussed, coupled with our increasing understanding of the theoretical issues discussed earlier, resulted in a successive series of revisions and refinements and, ultimately, in the lessons presented in this paper.

4. THE STUDY SKILLS INSTRUCTIONAL MATERIALS

4.1 Introduction to the materials

The materials which follow were designed to be used with junior-high or high school students who are classified as learning disabled or who are having difficulties in school due to poor study habits. The lessons are general in their approach, but they have been designed for use with social studies curriculum materials and consequently will require modification if used in any other content domain. The lessons are divided into two sections: One unit covers general study strategies, and four units cover specific study strategies.

The materials consist of a set of lesson scripts which contain the instructional material, and a set of mnemonic cards for the students' use. The lesson scripts have been designed in accordance with well established principles of direct instruction (Rosenshine, 1978). Each lesson begins by stating the aim of the lesson. This is followed by an overview of the material to be covered; a rationale for this information; instruction on the content of the lesson; presentation of relevant examples; and a final summary. At the end of each lesson the students are provided with an opportunity for supervised practice with the material that was covered. Each instructional unit is designed so that subsequent to the lesson presentation, the students receive repeated practice until each student can demonstrate proficiency in understanding and using the relevant skills. (Because of the intensive supervision required, we recommend that these materials be introduced to groups of ten students or less.)

The student materials consist of a set of mnemonic cue cards to enable the students to follow the steps of each procedure easily, without increasing their processing load. In the form in which they are presented here, the cards are of two types: a general study map (Appendix A, card #1) and procedural

cards (Appendix A, cards #2-6). The study map contains the beginning and ending steps used in each study session. There is one procedural card (Appendix A, card #2) which depicts a general study strategy for checking concentration, and there are four procedural cards (Appendix A, cards #3-6), which depict specific strategies. Each of the procedural cards is shown on a separate page in Appendix A. For actual use, however, they were cut to size so that they could be placed directly on the blank center area of the general study map (see Appendix A, card #7). The advantage of this arrangement is that it enables the student to visualize the relationship between the general and specific strategies. It becomes obvious that the general strategies (represented by card #1) are relatively constant strategies that should apply to all study situations. Likewise, the specific strategies (cards #2-6) can be changed depending on the nature of the assignment. During instruction, the students receive training in how to perform these substitutions using the appropriate materials. This concretizes the planning and selection process, and it places the activity within an integrated study plan.[7]

The instruction is planned for a regular classroom or resource room. No special training is required beyond familiarizing the participating teachers with the nature and purpose of the materials. This means that the teachers must have a thorough understanding both of the material in the lesson scripts and of the proficiency criteria the experimenter has set up as the goal of the practice sessions. The lesson scripts frequently refer to transparencies, and these should be reproduced from the material in Appendix A, according to the order indicated on the <u>materials</u> sheet at the front of the lesson scripts.

These materials should prove acceptable to teachers. The face validity of the instructional materials stems from the fact that they were designed

with the assistance of experienced school personnel to address the needs of teachers. The materials can be readily integrated into the regular curriculum since they involve homework assignments as the practice material. The study procedures have been made as simple as possible. Each lesson includes a common-sense rationale for the study strategies. Because of these advantages, the materials should prove easy to use in research. This prompts us to repeat our earlier warning. These materials are as yet untested, and should only be used for exeprimental purposes.

4.2 The lesson scripts for training study skills

LESSON SCRIPTS AND MATERIALS FOR INSTRUCTING STUDENTS

IN

GENERAL AND SPECIFIC STUDY STRATEGIES

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MATERIALS NEEDED FOR THE LESSONS

1. INSTRUCTIONAL MATERIALS

Here is a description of the materials referred to in the lessons.

Study map. The Study Map is designed to be used with a Cue Card (below). Together, they depict the steps to be followed while studying. The major points of the lessons are summarized on the Map and Cards. The Map shows general organizational and self-monitoring steps while the cards depict study strategies for various types of assignments. The students will learn to insert the appropriate Cue Card in the center of the map depending on the type of material to be studied. The Study Map is shown in Appendix A as Card #1.

Cue Cards. The Cue Cards fit into the center of the Study Map. The Cue Cards summarize the study strategies to be used with different types of homework assignments. There is one Card for a general study strategy, i.e., "Checking Concentration," and four Cards for specific strategies, i.e., "Memorization," "Questions and Problems," "Writing Assignments," and "Studying Notes or Books." The original Cards were each a different color so they could be easily differentiated. The Cue Cards are shown in Appendix A as Cards #2-6. Card #7 shows one Cue Card fitted into the Study Map.

2. HOMEWORK ASSIGNMENTS AND MATERIALS

The students' regular homework assignments should be used during the practice and review sessions of the study skills lessons.* It is recommended that the study skills instructor meet with the students' Social Studies teachers in order to match the study skills lessons with the type of homework assigned. It would be helpful if the teachers give a variety of types of homework.

*Note: The lessons refer to Social Studies assignments, but other subject areas may be tried.

The specific study strategies can be presented in any order to match the teachers' assignments.

3. FLAGS

The flags referred to in the "Studying Notes or Books" lessons are removable markers that can be placed on a page of a book or notebook. They serve as reminders for the students to ask themselves review questions. Paper clips or colored index card tabs can be used as flags.

4. SUPPLEMENTARY MATERIALS

It is suggested that the study skills instructor make overhead transparencies of the Study Map and the Cue Cards to demonstrate their use to the students. The lessons refer to transparencies which depict the following:

1. the beginning steps of the Study Map (referred to as transparency #1) [i.e., Card #1 - left-hand side],
2. the "Checking Concentration" Cue Card (referred to as transparency #2) [Card #2],
3. the ending steps of the Study Map (referred to as transparency #3) [Card #1 - right-hand side],
4. the Study Map (with a blank center) [Card #1 - whole card],
5. the specific strategy Cue Cards, i.e., one transparency for each of the four specific strategies [Cards #3-6],

[NOTE TO INSTRUCTOR: ALL COMMENTS ENCLOSED IN "[...]" REFER TO INSTRUCTIONS TO YOU, NOT MATERIAL TO SAY TO THE STUDENTS.]

GENERAL STRATEGIES - INSTRUCTION

Part I: BEGINNING A STUDY SESSION

[MATERIALS NEEDED:
1. Be sure that students have Social Studies assignments and materials so that they can work on their assignments later in the session.
2. Have available transparencies of the beginning, and ending steps of the Study Map and the Checking Concentration Cue Card.
3. Have the Study Maps and Cue Cards to be handed out at the end of the lesson.]

AIM

Today I want to tell you about a very special way you can plan your homework so that it becomes easier for you to manage and so that it will take less time for you to do. As well as making studying easier for you, this method will also allow you to actually improve your scores on tests and quizzes.

OVERVIEW

I will be showing you how to use a special study plan. It is a special plan for two reasons. First, it is special because it is not like regular study skills -- it's easier, yet more interesting. Second, I think it's special because I know that if you use it, it will really improve your scores on tests and quizzes. I will teach you to study better so that it is easy for you to do the homework that your teachers give you. You will learn how to use the study plan by using the assignments that you already have. Today I'll show you how to go about studying in study hall, and I'll then give you some time to work on your homework assignments.

RATIONALE

We're doing this so that you can learn to study as efficiently as possible. If you have a good plan for studying, you will learn better, you will score better on tests and quizzes, and you will get better grades on your assignments.

INSTRUCTION - Part 1

You will now learn 4 steps that you must always follow when you start planning your study period. These 4 steps are really important because they help you to plan.

1. Ask yourself: What do I need to do for homework? It will be easy for you to remember your assignments if they are written down someplace, like in a notebook or assignment book.

2. Get out the materials you will need for doing your homework.

3. Try to choose a quiet place to study.

4. Think about the assignment. What does the teacher expect you to do on the assignment? What are you supposed to learn? If you are studying for a test, ask yourself:
   What kind of information do I need to know?
   What material will the test cover? Will it be multiple choice, short answer, or essay? What questions will probably be asked?
   By thinking about the test, you will be better able to prepare yourself for it.

REVIEW

You don't have to try to remember these steps on your own. At the end of today's lesson, I'm going to hand out a Study Map to each of you that has the steps on it. For now, let's look at the transparency that shows the beginning steps. [Demonstrate transparency #1]

Just to review, let's go over the first steps. Before you begin studying you must 1) decide what you need to do for homework, 2) get out the necessary materials, 3) go to a quiet place to study, 4) think about the assignment or the test.

[Pause and ascertain if all of the students understand these steps, and clarify as necessary.]

EXAMPLE

[Use the students' Social Studies assignments as an example of how these steps can be used. Begin by asking questions such as: What is the Social Studies assignment that you have to work on today? What does the teacher expect? (length? complete sentences? neatness? etc.) What are you supposed to learn from this assignment?]

INSTRUCTION - Part 2

Now I will teach you a very simple way to be sure that you are concentrating on your work. This is important because when you don't concentrate, you end up wasting time and you don't learn the material.

It is important to check your concentration since you need to concentrate in order to understand the material, and you need to understand the material in order to do your homework well and in order to correctly answer questions on tests and quizzes.

While you are working you need to ask yourself: "Am I concentrating on the material? Does this make sense?" If you find that you have been day-dreaming or that you are stuck, you need to be sure that nothing in particular is distracting you. If something is distracting you, you should try to move

to a quiet spot. Then you need to begin studying that section of work again and be sure that you are concentrating on it. What types of things might make it hard for you to concentrate on your work when you are studying? [Elicit suggestions from the students. Summarize by saying that people talking, loud noises, etc. are often distracting and that it is important to go somewhere else if these things are happening.] Sometimes you are not distracted by anyone else, but you notice that you've been staring at your work or not really understanding it. In either case, you need to begin studying that piece of work again and be sure to concentrate this time.

REVIEW

These reminders, to concentrate and to begin again if you haven't been concentrating, will be added to the Study Map. [Demonstrate by placing Transparency #2 on top of transparency #1.] So far, our map looks like this. Are there any questions about these steps? What kinds of questions should you ask yourself to be sure you are concentrating on your work? Why is it important to check your concentration? What should you do if you realize that you've been daydreaming and you haven't been thinking about your work?

INSTRUCTION - Part 3

Now that you've learned how to begin a study session and how to concentrate on your work and be sure you understand it, I will show you a good plan to follow at the end of each assignment. This plan will allow you to check your work to make sure it's good enough.

I'm training you in how to check your homework and in how to prepare for tests so that you will do better on tests and quizzes and your grades will go up. The 3 steps you are about to learn are really important for finishing an assignment. Remember, no matter how hard you study it's easy to make a mistake or forget something. These steps wil help you check your work to make sure it is as good as possible.

To finish off your homework you need to 1) make sure you've completed the assignment, 2) make sure your work is good enough, and 3) decide what changes you need to make if your work isn't complete.

Now we can add the final section of our Study Map. Look here [display transparencies #1, #2, and #3, and point to the latter portion of the study map]. I'll explain each of these steps. [Point to steps on Study Map while explaining.]

1. When you think you are done studying, ask yourself: Have I done what the teacher expected? This reminds you to check that you have completed the assignment. Be sure to read all the material, answer all the questions, or whatever. It helps to look at your assignment book. If the assignment involved writing something, you also need to check the spelling, punctuation, and neatness.

If the work is not complete, ask yourself: Am I willing to make changes? If you are, go back and work some more on the assignment. If you're not willing to make changes, stop working. I must point out, though, that this Study Map works best when you are able to reach the star. [Point to the star at the end of the study map.]

2. Even when you are sure that the work is complete, you need to ask yourself: "Do I understand the material?" and "Do I know what I need to know?"

   If the answer is no, you need to decide if you are willing to review. If you are, go back to the study plan. If not, write down any questions you have and return to them later or ask someone for help. Don't forget that this Map works best when you follow all of the steps to reach the star at the end.

3. When you have done what the teacher expected, and the work is complete, and you understand the material, you have finished doing a good job of studying. You get to the star. This will help you do better on your tests and homework and your grades will go up.

SUMMARY

Before we use the whole Map, we're going to review the last steps I taught you. What questions do you need to ask yourself at the end of your studying? Let's say that you check back to your assignment book and you realize that you should have answered all 10 questions instead of the first 5. What are you going to do? What else do you need to check for on a writing assignment? Why is it better to try to make changes rather than to just stop working? If the work is completed, what do you do? What do you have to do to get to the star? Why is it important to try to get to the star whenever you study?

PRACTICE ON THE ENTIRE STUDY MAP

1. [Refer to the transparencies of the entire Study Map and of the Checking Concentration Cue Card.] Before I ask you to use the Map on your Social Studies assignment, let's review all of the steps from beginning to end. [Read each step and explain it as you go along. Ask for student input by asking probing questions, such as "What do you do next?" etc.]

2. [Distribute the Study Maps and the "Checking Concentration" Cue Card. Explain that they will be learning other strategies that will go in the center of the Map, but that for now, they are to use the Checking Concentration Card.]

3. [Have the students use the Study Maps and Cue Card on their Social Studies assignments. Go through the first steps as a class. Then have the students practice use of the Cue Card and ending steps of the Map on their own. Supervise each student individually.]

GENERAL STRATEGIES - REVIEW

[In subsequent sessions do the following until each individual student has mastered the techniques fully:

1. Review each step on the Study Map and Concentration Cue Card. Ask questions, etc.

2. Have the students use the Map and Cue Card on their Social Studies assignments.

3. Supervise the students' use of the Study Map and Cue Card by checking with each student individually.]

SPECIFIC STRATEGIES

UNIT I: MEMORIZATION - INSTRUCTION

[MATERIALS NEEDED:
1. Social Studies memorization assignments
2. 2 sample lists of Social Studies material to be memorized (5 items and 10 items, respectively)
3. Memorization Cue Cards (and Study Maps)
4. Transparencies of Study Map and Memorization Cue Card]

AIM

I'll begin today by showing you how to memorize something, either for a test or for class the next day. I will do this by teaching you a technique called rehearsal. Rehearsal is very useful for memorizing lists of words, lists of ideas, formulas, ideas for an exam, in fact anything you need to learn by heart.

OVERVIEW

In learning how to rehearse you will learn to divide whatever you have to learn into small pieces. You will learn how to rehearse or practice each piece and how to put the pieces together again so that you can remember the whole list by heart.

RATIONALE

It is well worth learning rehearsal because most quizzes and tests in school depend on memory. In Social Studies you often need lists of facts or main points. If you learn how to rehearse you will actually do better on quizzes and tests. Rehearsal can improve your scores right away because it will help you to remember more. In your mind, the place where you store things is called your memory. Lots of thoughts go through your memory every day. If you want to keep something active in your memory, out near the front, so that you can remember it when you need it, the best thing to do is to rehearse it. To rehearse you must do two things. First, you have to get the things into your memory, and then you have to keep them fresh in your mind until you need them.

INSTRUCTION

Here is how to rehearse.

1. Get out the list of items you need to learn.

2. If you don't have a list made out, make one now from the things you have to memorize.

3. Divide the list into groups of 5 or 6 items to make the list easy to manage. Learning things in small pieces is easier than trying to learn too much at one time.

4. Rehearse or practice one group by saying the items out loud or silently a few times.

5. Test yourself to see how well you did.

6. If you missed some, practice the ones you missed some more.

7. Test yourself again on the group.

8. If you still don't know some, go back and practice again, and test yourself again.

9. When you're sure you know that group, go to the next group, if there is one, and start again by rehearsing the items out loud or silently.

EXAMPLE

[Give an example of rehearsing a list of 5 facts here - have the list prepared in advance.]

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10. After you have finished all of the groups, combine the groups into one big list.

11. Practice or rehearse the full list.

12. Test yourself on the list.

13. If you missed some, practice the ones you missed.

14. Test yourself again, and if you missed some go back and practice again and then test yourself again.

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15. Every day, and again before your quiz or test, practice the whole list.

EXAMPLE

[Go through the steps again using a list of 10 facts--elicit these facts from the students and compile the list in class from their suggestions. Discuss different ways of dividing a list of facts such as by chronological order, people, places, etc.]

SUMMARY

Now let me review the steps you will need to follow in order to rehearse a list of items.

1) Divide the list into small pieces. 2) Practice each piece and test yourself on it. 3) Review the items you missed and test yourself again before you move to the next piece. 4) At the end, put all of the pieces together and

practice the whole list. Go back and rehearse or practice any items you missed. 5) Allow a few minutes every day and just before your test to refresh your memory.

CUE CARDS

You don't have to keep all of these steps in your head. However, you will want to use them every time you memorize so we'll give you one of these Cards with the steps listed on it to help you remember the steps you will have to follow. The Card will fit into the Study Map that I gave you earlier. [Distribute memorization Cue Cards now.]

This is how the Study Map will work when you have an assignment that requires memorization. [Demonstrate Study Map and Memorization transparencies. Explain each of the steps on the whole study map, including the new steps at the appropriate point.] Are there any steps you don't understand? [Clarify as necessary.]

PRACTICE

[Get the students to memorize real study assignments, e.g., definitions from the Social Studies text, or facts, on their own. Supervise their use of the Cue Card and Study Map. Prompt them, ask them to do it orally, question them, etc., to ensure correct usage of the technique you have just taught.]

MEMORIZATION - REVIEW SESSIONS

[MATERIALS NEEDED:
1. Social Studies memorization assignment
2. Memorization Cue Cards (and Study Map)
3. Wallchart of a paragraph containing several Social Studies facts.]

OVERVIEW AND RATIONALE

When you learned how to rehearse you learned to list whatever you had to memorize and to divide the list into small pieces. You rehearsed or practiced each piece, and then you put the pieces together and practiced the whole list. This study skill is an important one since most quizzes and tests in school depend on memory. In Social Studies, you often need lists of facts or main points. In order to remember these facts, you need to keep them fresh in your mind until you need them.

SUMMARY

Now let's review the steps you used when you had to memorize some information. Take out your Memorization Cards and Study Maps.

What is the Memorization Card useful for?

[Display the wallchart]

If you had to study this material and memorize the important information how would you begin? [Discuss making a list, grouping the list, and dividing the list.]

What do you do next?

Good. Let's start at the beginning and review all of the steps you need to follow. I'll read them and you follow them on your Maps. [Refer to the Map and Memorization Card and read the beginning, middle and ending steps indicating how they apply to your example.]

PRACTICE

[Have the students work on a Social Studies memorization assignment from their homework. Supervise their use of the Map and Memorization Card individually.]

[NOTE: Practice sessions should continue until each student reaches the desired proficiency criterion.]

SPECIFIC STRATEGIES

UNIT II: QUESTIONS AND PROBLEMS - INSTRUCTION

[MATERIALS NEEDED: 1. Social Studies assignments involving answering questions
2. Wallchart of Social Studies questions
3. Questions and Problems Cue Cards (and Study Maps)]

AIM

I am now going to show you how to complete the kind of homework or exam that involves either writing the answers to questions or working out the answers to some kinds of problems.

OVERVIEW

During this lesson you will learn a useful way to go about doing the answers to questions or problems. First you pick out and answer the easy questions or problems. Then you go back and try to work out the more difficult ones and finally you always check back over your work.

RATIONALE

If you learn how to write good answers to questions and problems, and if you learn to check your work, you will do much better on tests and quizzes, and your grades will improve.

INSTRUCTION

Here is how it works.

1. First, read all of the problems or questions to see what you need to do. As you read them, check off the ones you think you are able to answer. Doing the easy ones first has two advantages: (i) you will definitely get some of the work done this way; and (ii) you may find that the answers you have written to the easier questions will help you answer the harder questions.

2. Next, write the answers to the easy ones you just checked off.

3. Then go back to the problems or questions that you haven't answered and read the first difficult one.

4. Read the material now and see if you can work out the answer to this one.

5. If you can work it out, write the answer. Then go on and pick another question, if there is one, and try to find the answer the same way.

6. If you cannot find the answer, go back and try reading the material slowly a second time. Be sure to check anything you missed the first time which might help you find the answer.

7. If you found the answer this time, write it down.

8. If you did not find the answer, decide if you want to try looking again. If you do, reread the material. If you don't, either ask someone for help in locating the answer or else leave the problem for later.

9. If there is still another problem or question to be answered, follow the same steps again [i.e., begin with step 3].

EXAMPLE

[Go through the steps again, using the wallchart of Social Studies questions. Call on students to answer the easy ones out loud. With the hard ones, ask students where they might look to find the answer. Demonstrate that sometimes reviewing the answers to the easy questions will help them figure out the hard ones.]

SUMMARY

I'm now going to summarize the steps you need to follow when you have an assignment or test that requires you to find the answer to problems or questions. 1) Read all of the problems and check off the easy ones. 2) Answer the easy ones. 3) Read the material to answer the difficult ones one at a time. 4) Reread the material and look in other places (like in your notebooks, for instance) for answers to any of the questions which you find really difficult. 5) If there are still questions that you can't answer, ask someone for help.

CUE CARDS

To help you remember these steps, I've made up a Card which you can keep, like the last one. Use it with your Study Map each time you have to answer questions or work out problems. If you follow these steps you will find that you will do better on your tests and your quizzes. [Distribute Cue Cards. Demonstrate the Study Map and the Cue Card with transparencies. Read each step.] Are there any steps here you don't understand? [Give individual help as required.]

PRACTICE

Now I'd like you to take out your Social Studies assignments. I'd like to see how well you can do the questions. Use your Study Map and the Questions and Problems Card.

[During supervision, give prompts, question the students, etc., to ensure correct usage of the technique on an individual level.]

QUESTIONS AND PROBLEMS - REVIEW SESSIONS

[MATERIALS NEEDED: 1. Social Studies assignments involving answering questions
2. Questions and Problem Cue Cards (and Study Map)]

OVERVIEW AND RATIONALE

You've already learned a useful way to go about doing the answers to questions or problems. First you had to pick out and answer the easy questions. Then you went back and tried to work out the more difficult ones, and finally, you checked back over your work. These steps will help you improve your homework grades and will help you answer essay questions on tests and quizzes.

SUMMARY

Please get out your Study Map and the Questions and Problems Card so we can review the steps. What did you do first? Next?

Now I'll read the steps and I'd like you to follow them on your Maps and Cards. [Read the beginning, middle, and ending steps.]

PRACTICE

[Have the students use their Maps and Cue Cards with their Social Studies assignments. During supervision, give prompts, question the students, etc., to ensure correct usage of this study technique on an individual level.]

[NOTE: Practice sessions should continue until each student has reached the desired proficiency criterion.]

SPECIFIC STRATEGIES

UNIT III: WRITING ASSIGNMENTS - INSTRUCTION

[MATERIALS NEEDED: 1. Social Studies writing assignments
2. Writing Assignments Cue Cards (and Study Map)
3. Blackboard and chalk or blank wallchart and marker]

AIM

Today you will learn how to plan writing assignments for school so that they are written on the correct topic and so that the work is carefully checked before you turn it in.

OVERVIEW

First, I will show you how to make sure you are writing on the correct topic. Then you will learn how to check regularly to make sure you're still writing about the same topic, and you will also learn how to check your work when you're finished.

RATIONALE

Being able to write on the correct topic and being able to check your written work before the teacher corrects it improves your chances of getting a good grade on tests and essays. Doing careful written work can improve your grades on quizzes and tests.

INSTRUCTION

Here is how to do a writing assignment:

1. First, write down the title of the paper (or read the question if you are working on an essay test.) Ask yourself: What does the title or question expect me to write about?

   If it isn't a test and you need to read any information from your textbook or notes for the assignment, do so before you begin writing.

2. Write a paragraph on the topic.

   At the end of the paragraph STOP.

3. Ask yourself: "Is this paragraph really about what I am supposed to be writing?" and "Does it give information about the title?"

4. If the answer is no, you must decide how you can change the paragraph so that it fits in better with the topic.

   Make those changes.

Ask yourself whether the paragraph is now good enough. If not, decide how to change it and make those additional changes. You can keep doing this until you're satisfied with the paragraph.

Go on to the next paragraph and follow the same steps (Start with #3).

Keep going until you feel you've written all you need to write.

5. Write a conclusion to finish off the story.

EXAMPLE

[Write a title on the board. Ask students what the title implies, e.g. "What should the paragraph be about?" Complete the passage by asking the students one at a time for sentences. Write the sentences, or summary phrases, on the board. At the end of the paragraph, ask: "Does this paragraph give information about the title?" Make changes if necessary. Write another paragraph in the same manner. Write a conclusion.]

SUMMARY

Here are the steps you need to follow when doing writing assignments, or when writing the answer to an essay test. 1) Write the title or read the essay question. 2) Write a paragraph on the topic. At the end of the paragraph STOP. 3) Ask: "Is this paragraph really about what I am supposed to be writing?" and "Does it give information about the title?" 4) Make changes and ask the questions again as you finish each paragraph. 5) Write a conclusion to finish off the story.

CUE CARDS

To help you remember these steps, I've made up another card which you can keep. Use it with your Study Map each time you have to do a writing assignment. Remember, if you follow these steps, it will help you to do better on tests and essay questions. [Distribute Cue Cards now and read the steps.] Are there any questions? [Clarify as necessary.]

PRACTICE

[Have students do a Social Studies writing assignment. Supervise their use of the Map and Cue Card.]

WRITING ASSIGNMENTS - REVIEW SESSIONS

[MATERIALS NEEDED: 1. Social Studies writing assignments
2. Writing Assignments Cue Cards (and Study Map)]

OVERVIEW AND RATIONALE

You've learned how to make sure you are writing on the correct topic and how to check regularly while you are writing to make sure you're still writing about the same topic. You also know that you finish a paper by writing a conclusion. Doing careful written work can improve your grades on quizzes and tests.

SUMMARY

Let's review the steps on the Writing Assignments Card that I gave out last time. Take out your Map and Cue Card now.

How do you begin to write a paper? Then what do you ask yourself? What's the next step?, etc.

For review, I'll read the steps on the Map and Cue Card and I'd like you to read them to yourself as I say them. [Read the beginning, middle, and ending steps.]

PRACTICE

[Have students work on their own Social Studies writing assignment. Supervise their use of the Map and Cue Card individually.]

[NOTE: Practice sessions should continue until each student has reached the desired proficiency criterion.]

SPECIFIC STRATEGIES

UNIT IV: STUDYING NOTES OR BOOKS - INSTRUCTION

[MATERIALS NEEDED:
1. Social Studies reading assignment
2. Wallchart of Social Studies reading assignment (or copies for each student)
3. Studying Notes or Books Cue Cards (and Study Map)
4. Box of 'flags', i.e., paper clips, tabs, or some other kind of removable page marker]

AIM

Today I will show you how best to study for the type of homework assignments where the only directions you have from a teacher are to read or understand the material.

OVERVIEW

In this lesson you will learn how to read material so that when you finish studying you understand it. You will learn how to check your understanding as you go along. If you find that you are studying without really learning, I will show you how to change this. I will teach you how to check your understanding and I will show you what to do if the material is really very hard to understand.

RATIONALE

If you learn how to study your notes and books well, you will know the material better and you will do better on quizzes and tests and your grades will improve. Studying notes or books is the hardest kind of studying. You don't have any really clear work set out for you, so it is very easy to just sit there and not learn anything. The method we will show you works very well because it allows you to check whether you are really learning or not, and it also shows you what to do if you're having trouble either understanding or concentrating on the material.

INSTRUCTION

Here is how to study information from your notebooks or textbooks:

1. Before you begin, put a marker or flag at the end of each paragraph, or if you have a lot of reading to do, at the end of each page. [Demonstrate a flag.]

2. Now, begin reading the material carefully until you come to a flag.

   At the flag, ask yourself: "Do I really understand what I am reading?" and "Could I explain it to someone else?" Imagine that you had to explain the main ideas to someone else.

It is important to stop after each paragraph to be sure you understand it. If you keep going without understanding what you have read, you'll get more and more confused.

3. If you do understand it, read the next paragraph and ask yourself the same questions again at the end. If you don't understand it you must go back and read the text again, carefully, up to the same flag. Try to understand it this time.

   When you reach the flag again, ask yourself if you understand it fully.

4. If you do, go on. If you still don't understand what you read, you must decide if you want to try once more, in which case you go back and read it once again. Otherwise you must plan to get help from someone or leave this assignment until later.

5. When you're sure you understand what you have read up to the flag, begin reading and studying the next section and follow the same steps all over again [i.e., go to step 3].

EXAMPLE

[Go through the steps again, using the wallchart showing a brief section from one of the students' textbooks (or else see that each student has a copy of the piece of reading material). Ask students to explain what they are reading, etc.]

SUMMARY

Here again are the steps you need to follow when you have to study your notes or textbooks as a homework assignment. 1) Decide what it is you have to know when you are done. 2) Place the flags (one per paragraph or page) in the text, and begin reading. 3) When you reach a flag ask: "Do I understand what I am reading?" and "Could I explain it to someone else?" 4) If you are having problems, remove anything that might be distracting you and reread the material. 5) When you understand what you have read, read the next paragraph and ask yourself the same questions at the end of that paragraph. And so on...

CUE CARDS

To help you remember these steps, I've made up another Cue Card which you can use with the Study Map. Use it each time you have to study notes or a textbook. If you follow the steps, you will do better on tests and your grades will go up. [Distribute Cue Cards now.] Are there any questions? [Clarify as necessary.]

PRACTICE

[Have students use the Map and Cue Card with Social Studies assignments. Supervise. Monitor the students' use of the Cue Card. Have students explain what they have just read.]

STUDYING NOTES AND BOOKS - REVIEW SESSIONS

[MATERIALS NEEDED: 1. Social Studies reading assignments
2. Studying Notes and Books Cue Cards (and Study Map)
3. Flags [or Markers]

OVERVIEW AND RATIONALE

I have already taught you how to read material so that when you are finished studying you understand it. You know that you need to check your understanding as you go along and that you need to review the material if you don't understand it.

SUMMARY

Get out your Maps and Studying Notes and Books Cards.

When you are studying with notes or books, what do you need to do first? Then what? When would you use these steps?

Here again are the steps you need to follow when you have to study your notes or textbooks as a homework assignment. [Read the beginning, middle, and ending steps.]

PRACTICE

[Use actual homework material as a basis for supervised practice with the Study Map and Cue Card. Prompt, question, etc. Have students explain what they have just read.]

[NOTE: Practice sessions should continue until each student reaches the desired proficiency criterion.]

5. A PROSPECTUS FOR PROGRAMMATIC RESEARCH ON THE NATURE OF STUDY SKILLS AND HOW THESE SKILLS MIGHT BE ENHANCED THROUGH TRAINING

There are two major problems that confront the researcher who is engaged in teaching study skills. First, it is extremely difficult to do useful training research in the absence of reliable data on the psychological process of interest. As our earlier discussion revealed, there has been much intelligent speculation on the nature of metacognition, and on the correspondence between what are regarded as the component parts of metacognition and those skills that are required for effective study. However, this psychological model has yet to be validated. To make matters worse, researchers in this field must also confront the possibility that a unitary set of study skills may not exist, and that such a conceptualization is too simplistic, serving to mislead the researcher by masking the complexity of cognitive skills. Clearly the answer to the latter question can only be decided on the basis of a better data base. It is a fact, however, that there are many students with study problems, and these problems cannot be ignored by educators and psychologists. Thus it is appropriate to conduct training studies with the aim of improving students' study behavior (Brown et al., 1983). When conducting such training studies, however, it is the responsibility of the researcher to make explicit the untested assumptions underlying the materials, and to describe any limitations on their use. It is in that spirit that this report was written.

The assumptions underlying these lessons have been stated but the lessons still need to be tested. We propose the following plan for field research. Two groups of students should be selected from a specific target population. The experimental group would receive the current training program until they reached a pre-determined proficiency criterion, while the control group would

receive no training. The control group represents an ideal natural group of untrained subjects for an investigation of the basic process of studying. We suggest that both groups receive in-depth pretesting; that both be studied microgenetically in a longitudinal setting over the course of an entire semester; and that both groups receive in-depth posttesting and delayed posttesting. The advantage of such a comprehensive approach is that it would enable the researcher to study the precise effects of the training on the week-by-week performance of the experimental group, while simultaneously investigating the natural study technique of students in the control group who would presumably be employing their regular study habits each week on the same homework assignments. Let us now sketch, briefly, the major components of this approach.

5.1 Developing appropriate measures

One of the most difficult challenges facing a researcher in this area is that of deciding how to measure changes in study performance. In the first study (O'Loughlin et al., 1982) gain on a standard reading test was the principal dependent measure. As our earlier discussion indicated, quantitative measures such as this are difficult to interpret because they give no information about changes in, or level of, utilization of the process of interest. Furthermore, standardized tests fail to address our concern about the importance of contextual relevance. Consequently, we decided that more qualitative, performance-oriented measures were desirable. While our progress to date offers no definite solution, we have considered two interesting possibilities. First, for the performance measure, we have toyed with the idea of using some form of teacher rating. If the disadvantages of such a measure could be overcome, it would be the ideal solution because the students could do their homework in regular study hall and the researcher could easily evaluate their performance by

examining how well they attained the study goals contained in the teacher's assignment.

In operational terms, the most efficient way to utilize the teacher rating scale would probably be to have the teacher write out the goal for the lesson in advance along with the usual grading criteria. The teacher could then be asked to convey these goals and grading criteria to the students in his or her usual manner, and the teacher would later be asked to grade the relevant homework, and to make these grades available to the researcher. Meanwhile, the students would be asked to study the specific assignment that was to be the target of grading during the supervised study hall. This controlled study situation presents the researcher with the additional opportunity of keeping observational records of study behavior. Because of the difficulty of defining observable study behaviors, we have become pessimistic regarding the likelihood of developing a meaningful observational measure. Instead we are experimenting with a self-report measure.

Verbal reports are fraught with problems (Nisbett & Wilson, 1977) but following Ericsson & Simon (1980) we believe that used intelligently they can be valuable in offering insights into complex cognitive processes. We suggest conducting a specific interview at the end of each study session, probing the students' perception of the goals and grading criteria of the assignment. This could offer clues as to the way students encode the teacher's directions. The information could then be readily compared with the teacher's actual goal and criteria (recorded by the teacher at an earlier time), and the students' final grades for that assignment. Further probes might reveal the relationship between the way directions are encoded and the strategies selected for completing the assignment. This type of interview is not likely to be espe-

cially difficult to interpret as it could take place immediately after the study period while the material is still active in the student's mind, thus minimizing the necessity for reconstruction on the student's part.

More difficult, but of great value too, if it could be developed, would be a pretest-posttest type interview which would explore the individual's knowledge about and current approaches to study. This could reveal major changes in study skills over a period of time. While our initial efforts in this direction have not been encouraging, we are still trying to develop an interview measure based on the "critical incident" technique advocated by Flanagan (1954; see also Ericsson & Simon, 1980). We hope that this (or another approach) may yield a reliable index to general changes in the individual's knowledge about studying and her or his ability to select appropriate study strategies.

5.2 Using a microgenetic method

The selection of appropriate research measures is of course integrally linked to the type of research method which is used. In our case, the qualitative and contextually valid performance measures discussed above have been suggested because they would complement the use of a microgenetic (or microanalytic) approach to the investigation of study skills. In keeping with Brown et al. (1983) we agree that meaningful research on basic cognitive processes cannot afford to ignore this useful research method. While this is not the place to enter into a critical discussion of the utility of the microgenetic method or its applications,[8] we will briefly outline the approach and discuss its application to study skills research.

The microgenetic research method uses naturalistic observational measures to chart qualitative changes in an individual's strategies over time. It

is predicated on the assumption that, with repeated opportunities to practice a given strategy, subjects' use of that strategy will change. The focus of the microgenetic approach, then, is on observing changes which occur in the individual's strategies as a result of this experience. Recent research (e.g., Kuhn & Phelps, 1983; see also Brown et al., 1983) suggests that two particular types of change are. First, there is the predictable pattern of advancement from the selection of less sophisticated cognitive strategies to the adoption of higher level complex strategies. Second, there is the apparently difficult matter of abandoning existing strategies to make way for new ones. Kuhn's work (Kuhn & Phelps, 1983; see also Brown et al., 1983) suggests that the latter is the more difficult of the two tasks, and is the one which deserves more attention in psychological research because cognitive advancement can only occur once the decision to abandon existing strategies has been made. A critically important feature of the microgenetic approach is that instead of testing for group variance, it offers a very sensitive index of an individual subject's acquisition of new strategies, and the relationship between this acquisition and her or his willingness to abandon old strategies. Even before we spell it out, the parallel between the strengths of this method and the requirements for a method to study study skills may seem obvious. Here are our suggestions for how this research method might be applied.

The investigator selects two groups from an appropriate target population. One group, designated the experimental group, receives study skills instruction. The control group receives no such instruction. In all other respects, both groups are treated identically. Assuming that the necessary measures have first been developed, both groups receive pretest interviews and baseline ratings are obtained with the teacher homework rating scale. Once the experimental phase

begins, both groups are supervised in study hall, and are required to work during the designated study periods on the assignments which are the target of the special teacher rating scheme. Both groups gain study experience in a supervised setting so we can reasonably predict some improvement in the study habits of all students over the time span of the experiment. The control group will be exercising familiar study strategies and the experimental group will be using new procedures taught to proficiency during a prior instructional period. Assuming that an appropriate measure can be devised (e.g., the interview alluded to earlier), the microgenetic method will enable the progress of each individual in each group to be charted from week to week. Thus it is possible to monitor the pattern of change in students' perceptions of the requirements of the homework assigned to them, and concomitant changes in their study strategies, if these occur.

For the control group this approach has the potential of charting the normal developmental trajectory for these skills, and for highlighting obstacles (e.g., reluctant abandonment of comfortable but inefficient study habits) which impede the smooth development of efficient study skills. At the same time, this approach promises to offer a precise analysis of exactly how well the experimental group assimilates the skills that were trained. The assimilation of "trained" skills can be observed in juxtaposition with the use of regular study skills by untrained students. These data should provide an ideal empirical base for validation or modification and revision of a training program.

In summary, we suggest that, through the use of sensitive qualitative measures and the microgenetic research approach, it is possible to advance the cause of both basic and applied research in study skills. If researchers devote the necessary energy to developing useful performance measures so that

the full potential of the microgenetic approach can be realized, it will only be a short step from there to the point where wide-ranging programmatic research can be undertaken. Issues that could then be investigated would include the nature of intergroup differences in study performance (e.g., high-achievers vs. low-achievers vs. learning disabled), and the generalizability of study skills training effects across different subject domains, teachers and schools.

FOOTNOTES

1. Our work has been particularly influenced by the writings of Anderson (1979; 1980), Anderson & Armbruster, (1980); Armbruster & Anderson (1981); Brown, (1978; 1980; 1982); Brown Bransford, Ferrara & Campione (1983); Brown, Campione & Day (1981); Brown & DeLoache (1978).
2. See Brown et al. (1983) and Ericsson & Simon (1980) for a discussion of the measurement difficulties associated with the study of metacognitive processes.
3. See, for example, Bransford, Stein, Shelton & Owings (1981); Bransford, Stein, Vye, Francis, Auble, Merynski, & Perfetto (1983); Brown (1982); Brown et al. (1983); Chi & Rees (1983); Siegler (1983); for a discussion of aspects of learning as a complex cognitive activity.
4. Compare our "writing strategies" for example, with the ones employed by Bereiter and Scardamalia (1980; Scardamalia and Bereiter, 1980), or our "text studying strategies" with those discussed in Brown & Smiley (1978).
5. Copies of the O'Loughlin et al. (1982) paper, and the original instructional materials are available on request from the first author.
6. Copies of the survey questionnaire are available on request from the authors.
7. As a further aid to the students, we reproduced the general study map and each of the specific cue cards on different colors of heavy card stock. This increased the durability of the cards and made them easier to differentiate. Copies of these materials are available on request.
8. For a discussion of teh origin and nature of the "experimental-genetic" approach see Vygotsky (1978) and Werner (1948). Kuhn and Phelps (1983) offer a detailed example of the application of the microgenetic approach in the cognitive domain, while a critical discussion of this methodology appears in O'Loughlin & Fleischner (manuscript in preparation).

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Appendix A: Student materials to accompany the lesson scripts

Note: Refer to the text, Section 4.1, and to the materials page at the beginning of the lesson scripts for information on:

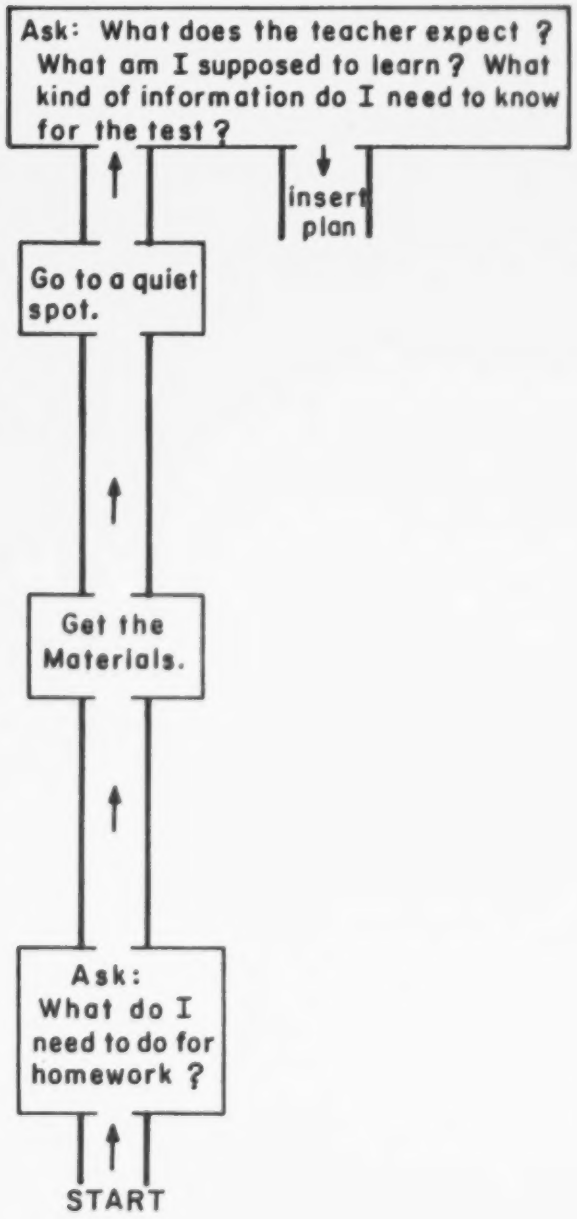
*how to use these materials

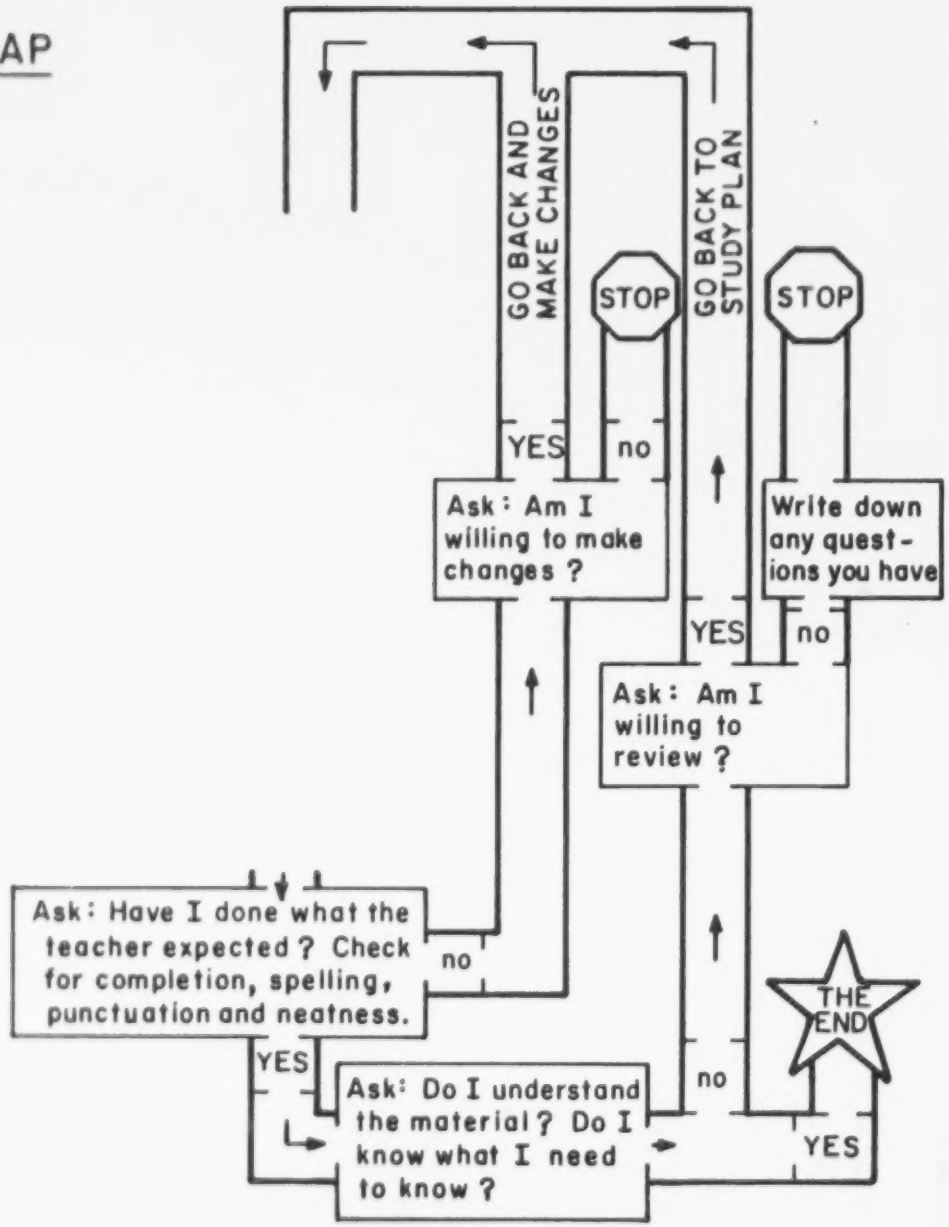
*how to reproduce them on colored card-stock for student use

*how to make the transparencies that are referred to in the lesson scripts

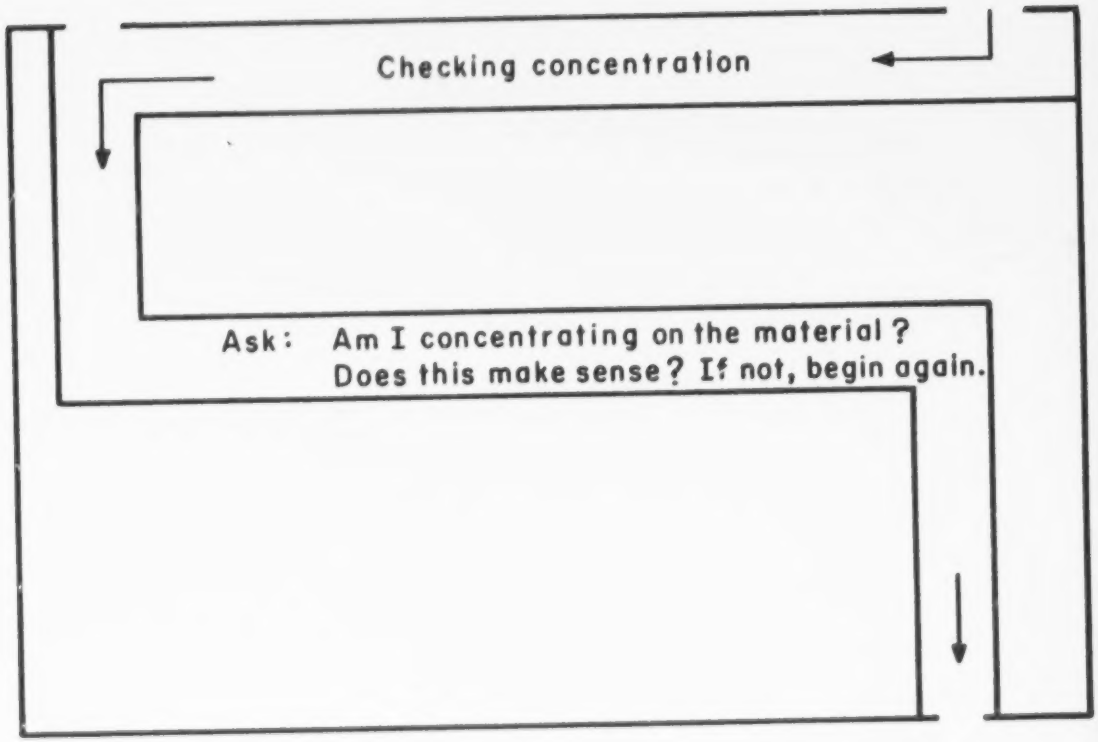
Card #1: General Study Map

STUDY MAP

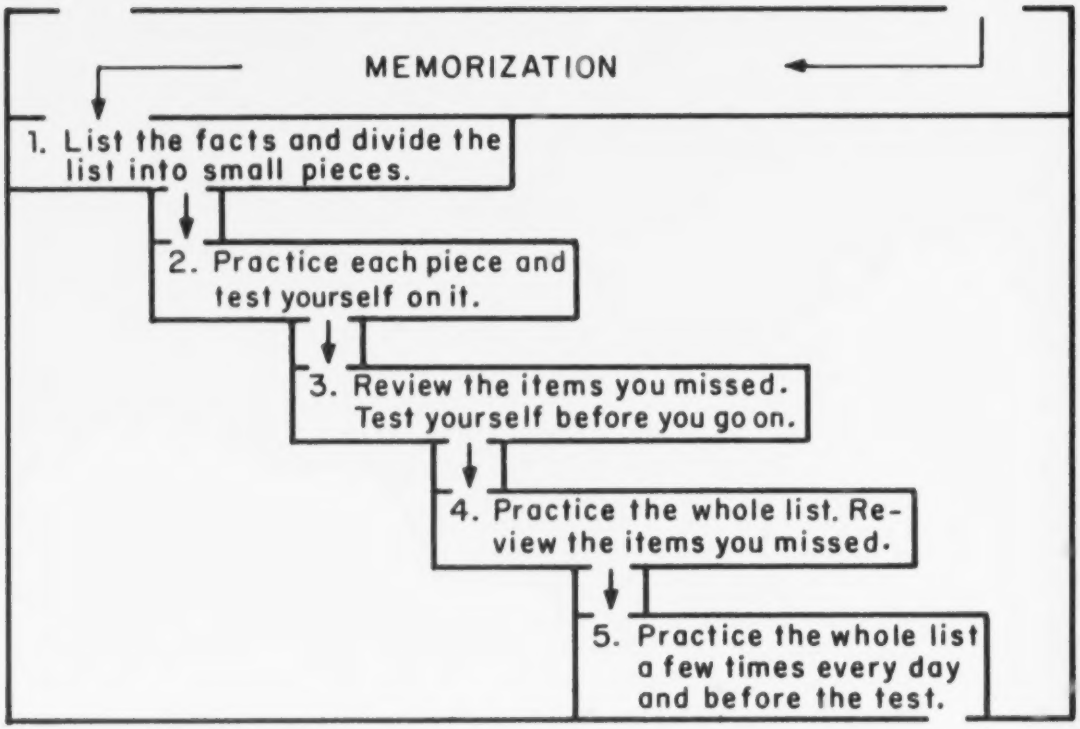

Ask: What does the teacher expect ? What am I supposed to learn ? What kind of information do I need to know for the test ?
insert plan
Go to a quiet spot.
Get the Materials.
Ask: What do I need to do for homework ?
START


GO BACK AND MAKE CHANGES
GO BACK TO STUDY PLAN
STOP
STOP
YES
no
Ask : Am I willing to make changes ?
Write down any quest - ions you have
YES
no
Ask : Am I willing to review ?
Ask : Have I done what the teacher expected ? Check for completion, spelling, punctuation and neatness.
no
YES
Ask: Do I understand the material ? Do I know what I need to know ?
no
YES
THE END

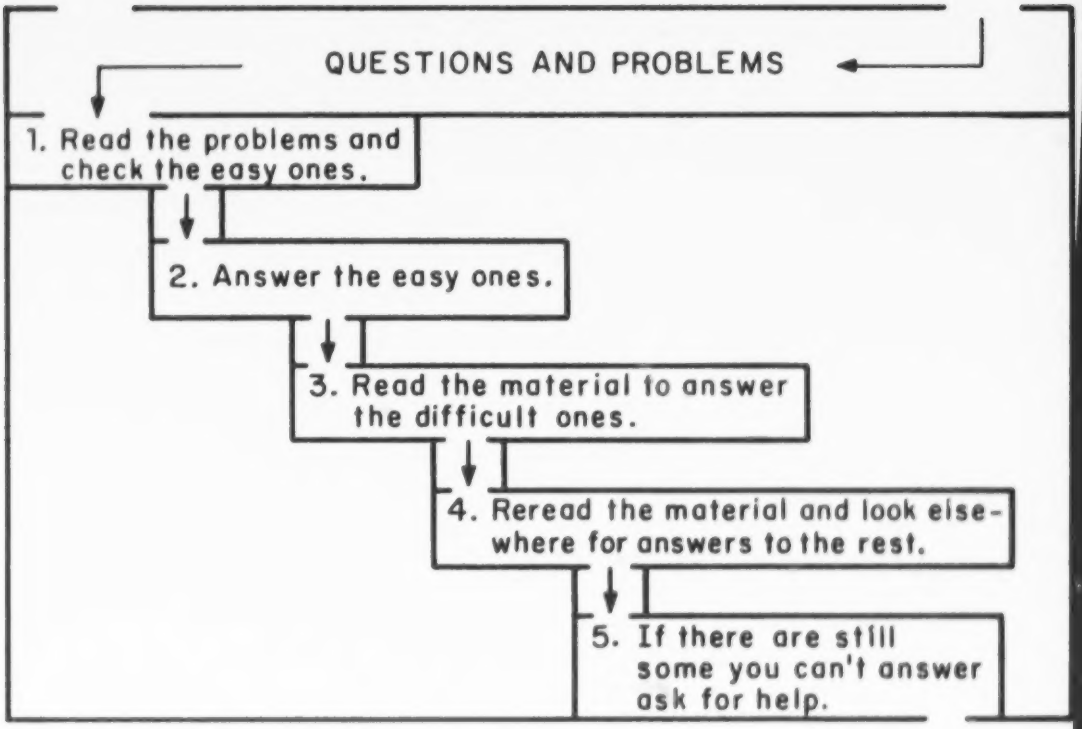
Card #2: "Checking Concentration" Cue Card


Checking concentration
Ask: Am I concentrating on the material?
Does this make sense? If not, begin again.

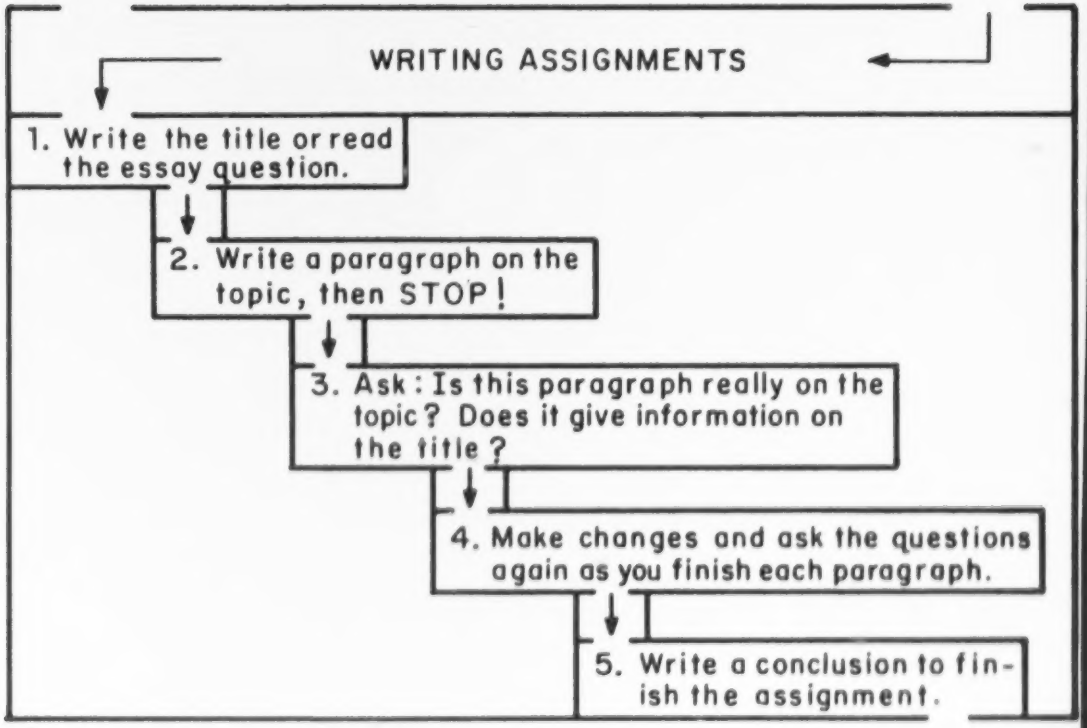
Card #3: "Memorization" Cue Card


MEMORIZATION
1. List the facts and divide the list into small pieces.
2. Practice each piece and test yourself on it.
3. Review the items you missed. Test yourself before you go on.
4. Practice the whole list. Review the items you missed.
5. Practice the whole list a few times every day and before the test.

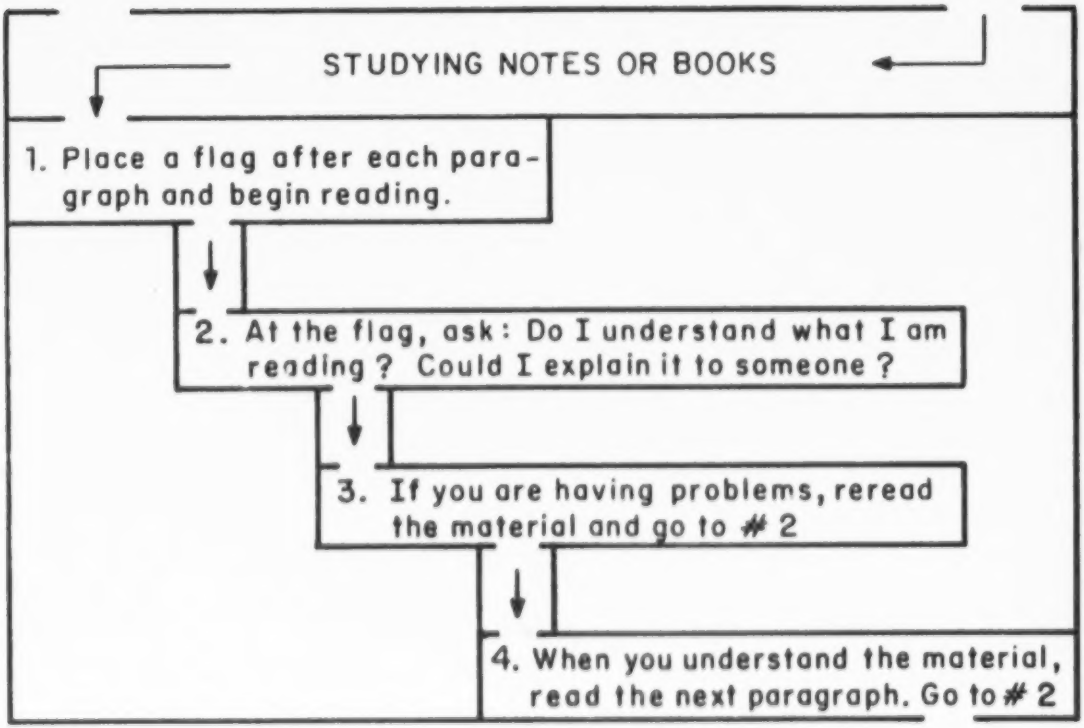
Card #4: "Questions and Problems" Cue Card


QUESTIONS AND PROBLEMS
1. Read the problems and check the easy ones.
2. Answer the easy ones.
3. Read the material to answer the difficult ones.
4. Reread the material and look elsewhere for answers to the rest.
5. If there are still some you can't answer ask for help.

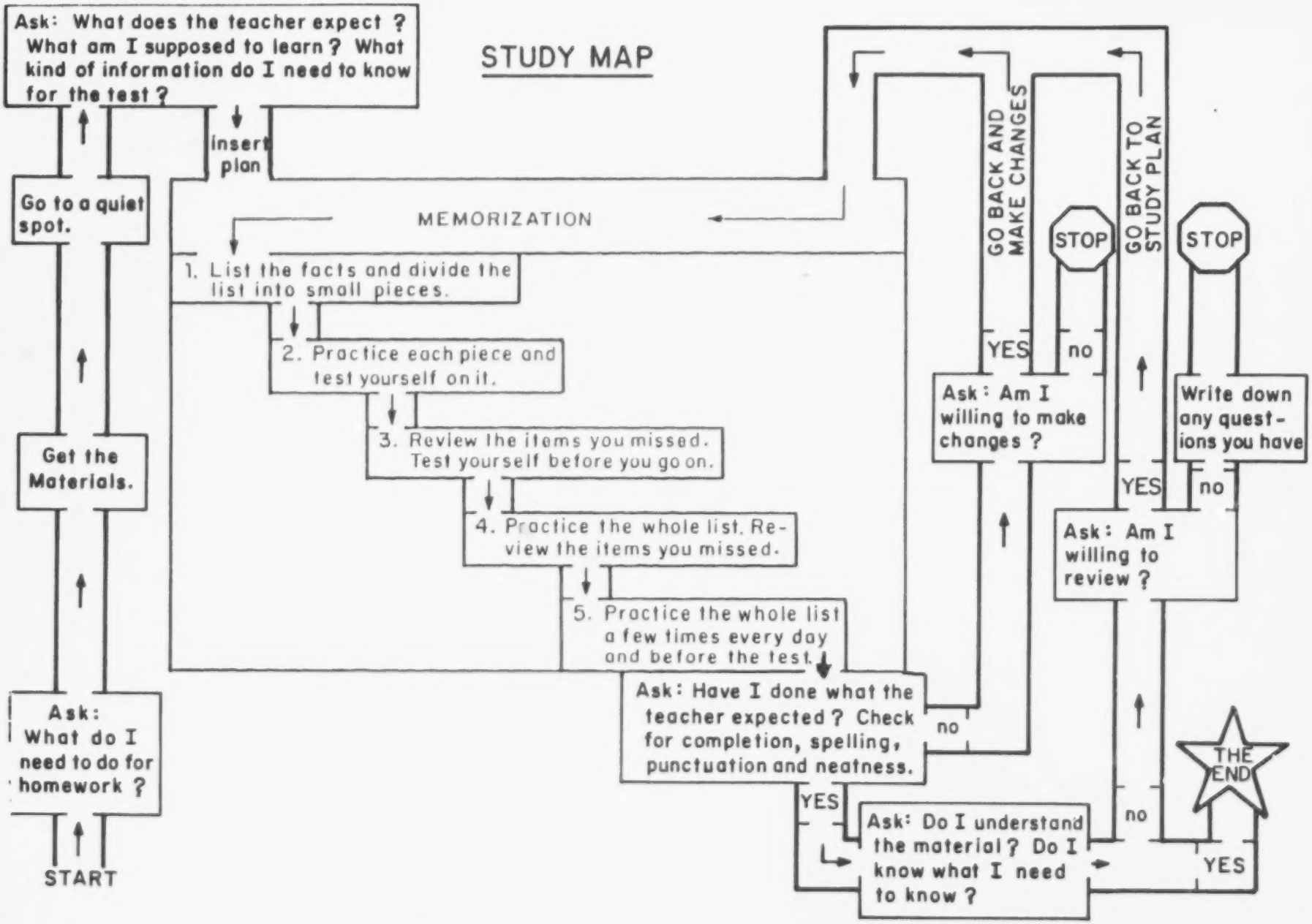
Card #5: "Writing Assignments" Cue Card


WRITING ASSIGNMENTS
1. Write the title or read the essay question.
2. Write a paragraph on the topic, then STOP!
3. Ask: Is this paragraph really on the topic? Does it give information on the title?
4. Make changes and ask the questions again as you finish each paragraph.
5. Write a conclusion to finish the assignment.

Card #6: "Studying Notes or Books" Cue Card


STUDYING NOTES OR BOOKS
1. Place a flag after each paragraph and begin reading.
2. At the flag, ask: Do I understand what I am reading? Could I explain it to someone?
3. If you are having problems, reread the material and go to # 2
4. When you understand the material, read the next paragraph. Go to # 2

Card #7: An example of the relationship between the general study map and a specific Cue Card (Memorization)


STUDY MAP
Ask: What does the teacher expect ? What am I supposed to learn ? What kind of information do I need to know for the test ?
insert plan
Go to a quiet spot.
Get the Materials.
Ask: What do I need to do for homework ?
START
MEMORIZATION
1. List the facts and divide the list into small pieces.
2. Practice each piece and test yourself on it.
3. Review the items you missed. Test yourself before you go on.
4. Practice the whole list. Review the items you missed.
5. Practice the whole list a few times every day and before the test.
Ask: Have I done what the teacher expected ? Check for completion, spelling, punctuation and neatness.
no
YES
Ask: Do I understand the material ? Do I know what I need to know ?
no
YES
GO BACK AND MAKE CHANGES
STOP
YES
no
Ask : Am I willing to make changes ?
GO BACK TO STUDY PLAN
STOP
Write down any quest - ions you have
YES
no
Ask : Am I willing to review ?
THE END